GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION
SPONSORED PROJECT INITIATION

Date: 9/24/80

Project Title: Training and Technical Services for KCGF

Project No: A-2652

Project Director: Ben E. James

Sponsor: Korea Credit Guarantee Fund

Agreement Period: From 7/1/80 Until 6/30/81

Type Agreement: Agreement for Training and Technical Services dated 5/20/80

Amount: $88,756*

Reports Required: Quarterly Letter Progress; Annaul Report

Sponsor Contact Person (s):

Technical Matters	Contractual Matters (thru OCA)
Byoung Soon Song Chairman & President KCGF Korea Credit Guarantee Fund C.P.O. Box 1029 Seoul, Korea	

*Includes $17,490 to be paid by KCGF in local currency for locally incurred expenses.

Defense Priority Rating: N/A

Assigned to: EEL/IPO (School/Laboratory)

COPIES TO:

- Project Director
- Division Chief (EES)
- School/Laboratory Director
- Dean/Director–EES
- Accounting Office
- Procurement Office
- Security Coordinator (OCA)
- Reports Coordinator (OCA)
- Library, Technical Reports Section
- EES Information Office
- EES Reports & Procedures
- Project File (OCA)
- Project Code (GTRI)
- Other

CA-3 (3/76)

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION
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- Other

CA–3 (3/76)

Project A-2652

1ST Quarterly Report

MANAGEMENT AND TECHNICAL ASSISTANCE PROGRAM TO KOREA CREDIT GUARANTEE FUND

Loan and Lease Guarantee Companies

3rd Year of Project

Period Covered:

August 10 - September 12, 1980

by

R. Lynnard Tessner
Research Engineer

Industrial Extension Division
Engineering Experiment Station
GEORGIA INSTITUTE OF TECHNOLOGY
Atlanta, Georgia 30332

October, 1980

During the first visit under the current contract, the Georgia Tech representative made 24 visits to companies participating in this year's KCGF extension program.

The original plan called for the GIT representative to visit 9 companies, but because many of these nine needed answers to very specific questions which could be answered only by securing technical data from Atlanta, the total time needed to supply the data was short. As a result, additional companies were visited to gather more details on the questions posed last year, and/or to supply on-the-spot technical assistance. The total number of firms visited was 17.

As in previous visits, some of the companies were very open and willing to supply information as to their problems, and to receive data and suggestions from the GIT representative. Generally, such firms are both profitable and well-managed and would be considered excellent prospects for very successful extension efforts.

Other firms were not as willing to supply information on their problems or to receive assistance with them. The percentages of the companies within the Republic of Korea and those of like attitudes in the State of Georgia which are willing to accept and use our assistance are very similar.

Since there seems to be no way to screen companies in order to choose the receptive ones from among the non-receptive, a large amount of time must be spent in visiting all firms.

The companies are listed in alphabetical order so as to speed reference to any one company.

Project A-2652

2ND QUARTERLY REPORT

MANAGEMENT AND TECHNICAL ASSISTANCE PROGRAM TO KOREA CREDIT GUARANTEE FUND

Loan and Lease Guarantee Companies

Period Covered:

November 8 - December 12, 1980

by

Ben E. James, Jr.
Senior Research Engineer-Project Director

Industrial Programs Division
Engineering Experiment Station
GEORGIA INSTITUTE OF TECHNOLOGY
Atlanta, Georgia 30332

January 1981

During the five week period of activity beginning November 8, 1980 and ending December 12, 1980, the GIT Field Engineer made twenty-five visits to eleven companies participating in the KCGF Extension program. Visits were also made to several agencies and organization and included several equipment supply companies as well as Soong Jun University Mechanical Engineering Department. As in past visits, the major thrust of the work program by the GIT field engineer was in visiting the designated companies, determining their information and assistance requirements, and then performing the necessary research in order to fullfill their requirements.

During this five week period, it was gratifying to observe that there was a very high degree of participation in company visits and problem solving by the KCGF technical staff. If this accelerated participation by the KCGF technical staff can be continued, technical self-sufficiency by the KCGF Extension Department can be achieved much sooner. As in previous periods, a great deal of time during this five weeks was spent counseling the younger KCGF staff in both technical areas and in field extension techniques.

The reporting format for extension activities with the individual companies was changed slightly during this period. The major headings in the revised reporting format now include the company name, the date/dates visited, the KCGF staff involved in the visits and research, the principle products involved, the previously observed problems or questions, the observed problems or questions during the current period, the action performed during the current period, the future planned action by GIT and KCGF and finally, the observed results or company reaction. It is felt that this revised format will minimize any confusion when these reports are translated from English into Korean. One of the major problems which will be encountered on any type of reporting format which might be used is that of effectively explaining technical questions and engineering solutions to concerned authorities who are not familiar with the techniques, procedures and terminology used in technology transfer.

It is the opinion of the GIT representative that this five week period was very productive in terms of the quality of technology transferred and also the quantity of technology transferred. This success was due in part

to the excellent scheduling job done by the KCGF Extension staff. During this period, by each Friday afternoon the fixed schedule for the following week was given to the GIT representative and discussed. This excellent job of scheduling allowed the GIT representative to maximize advanced planning and research so that there was a minimum of wasted time. The KCGF staff is to be commended for its scheduling job.

Company Visited or Service	KCGF and KCGF Staff	Problems or Questions	Observed Problems or Questions During Current Period	Action During Current
Kwang Shin Gear Co. - Metal Gears	11/10 - Lee, Un Young; Cha, Sang Un; Soon, Lee Sik. 11/20 Kim, Kee Hong; Cha, S.U. 12/5 Kim, K.H, Cha, S.U. 12/11 Kim, K.H, Cha, S.U. Shin, Sang Un; Park, Chul Soo	1. Raw Material inspection methods & equipment 2. Gear Blank Homogenization Methods 3. Spindle Knurling Problems	1. Straightening Knurled and Hardened Shafts 2. Deburring methods for soft steel Sprockets 3. Need information on U.S. Imports of motorcycle sprockets 4. Early failure of drill bits and poor hole quality	1. Investigated present st ing methods and made co comparison with alternate Comparison indicated that pa method, although labor in was most effective. 2. Provide design concepts process information on "Va Finishing" process for Sprock deburring 3. Determined that bit failu was probably caused by im bit sharpening and improper "Speed and Feed" in Drilling ope
Samchully/Heat Treatment Co. Custom Heat Treating	11/4/80 - Kim, Kee Hong; Cha, Sang Un; Sung, Gap Sik. 12/2/80 - Kim, K.H; Cha, S.U.; Sung G.S. & Park Chul Soo	1. Recommended materials for drive studs 2. Decarburizing methods using Dry Pack Furnace 3. How to harden 304 stainless steel 4. How to toughen and remove soft spots in gas carburized rimmed steel 5. How to eliminate segregation and obtain uniform hardness after quenching AISI 4140 alloy steel castings	1. A subsidiary company had problems with failure of drive stud gun pistons 2. Need information on using cold head machine for producing drive studs 3. Needed Prices and Delivery Time for Drive Stud Guns and Drive Studs manufactured in the U.S.	1. Provided results of micro ha Profiles on drive studs wh had been tested at Ref. in 2. Provided information on Har 304 Stainless Steel. 3. Provided information on re soft spots in rimmed ste 4. Provided information on u uniform hardness of AISI 4140 s 5. Provided Datsun Design in on U.S. made Drive Stud Guns Drive Studs. 6. Provided suggestions and id on ways to reduce piston fa 7. Provided information on co head angles and equipment Forging Drive Studs. 8. Provided information on Heat T Furnaces.

Project A-2652

3ED QUARTERLY REPORT

MANAGEMENT AND TECHNICAL ASSISTANCE PROGRAM TO KOREAN CREDIT GUARANTEE FUND'S LOAN AND LEASE GUARANTEE COMPANIES

by

James C. Muller
Senior Research Engineer

This report covers the five weeks field engineering work from March 5 to April 10, 1981.

Engineering Experiment Station
GEORGIA INSTITUTE OF TECHNOLOGY
Atlanta, Georgia 30332, U.S.A.

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Preface

This report covers the third field visit of the third project year, the inclusive dates are March 7 through April 10, 1981. During this period the GIT field engineer made twenty visits to ten companies. The purpose of these visits was to provide information and assistance on problems and questions that were carried over from former field visits and to handle new requests and problems that had been identified in the interim period. Also, the GIT consultant shared his experience and expertise with the client companies and the KCGF staff in such areas as metalworking technology, plant layout, material handling, programmable controllers, and group technology.

The GIT field engineer was well received at all the companies. However, the companies had varying degrees of need for assistance and some companies exhibited more enthusiasm than others. In retrospect, the consultant performed the bulk of the assistance work with six of the companies. He provided original ideas, plans and/or drawing to four of the companies and a significant amount of information from secondary research to these as well as to the other two companies receiving the bulk of the assistance. He provided a moderate amount of information to an additional two companies and a small amount to the last two companies.

The GIT consultant was permitted to observe the complete manufacturing operations of each of the client companies with the exception of one which declined his request. Although it is not impossible to assist a client without observing his operation, it is difficult.

The KCGF staff did an excellent job in scheduling the visits and in logistically supporting the GIT consultant. The GIT consultant was able to devote the maximum amount of his time to the task of assistance due to the excellent support. Also, the KCGF staff members demonstrated a mastery of the english language and a quick understanding of technical matters and were thus able to easily break the language barrier which existed between the GIT consultant and some of the clients.

SUMMARY REPORT
3RD YEAR KCGF/GIT PROJECT - 3RD FIELD VISIT
FIELD ENGINEER - MULLER

COMPANY NAME PRODUCT OR SERVICE	VISIT DATES KCGF STAFF	PREVIOUSLY OBSERVED PROBLEMS OR QUESTIONS	OBSERVED PROBLEMS OR QUESTIONS ASKED DURING CURRENT PERIOD	ACTION DURING CURRENT PERIOD	FUTURE COMPANY REQUIREMENTS	OBSERVED RESULTS AND COMPANY REACTION
HANKOOK CORE CO EI TRANSFORMER CORES	3-13, 3-26 & 4-3 CHA, JAMES UN SHIN, JUNG SUP	1. PROVIDE ASSISTANCE ON PLANT LAYOUT IMPROVEMENT 2 PROVIDE COMPREHENSIVE INFORMATION ON DIE SHOP FACILITIES AND EQUIPMENT. 3 PROVIDE INFORMATION ON U.S. STROKES PER MINUTE ON E-I CORES. 4. PROVIDE ADDITIONAL CONCEPTS FOR SENSORS AND CIRCUITS TO MONITOR STEEL THICKNESS AND CAMBER 5. ATTEMPT TO ACQUIRE "FINE BLANKING HANDBOOK" BY FEIN TIGL CO.	1. EXTREMELY CROWDED PLANT WITH POOR WORK FLOW. 2. DAMAGE TO RAW MATERIAL AND FINISHED GOODS DUE TO WEATHER AND ROUGH HANDLING 3. LACK OF BUSINESS VOLUME TO PERMIT PLANT TO OPERATE MULTIPLE SHIFTS AND THUS JUSTIFY CAPITAL EQUIPMENT. 4. INTEREST IN GROUP TECHNOLOGY. 5. DESIRE FOR MARKETING INFORMATION AND SOURCES OF DISTRIBUTION IN THE U.S.	1. PROVIDED INFORMATION ON DIE COMPONENTS AND A "DIE ENGINEERING HANDBOOK" BY LEMPCO INC. 2. PROVIDED A COMPLETE CATALOG OF COIL HANDLING EQUIPMENT MANUFACTURED BY COOPER-WEYMOUTH 3. PROVIDED A FEIN TOOL CATALOG 4. PROVIDED INFORMATION ON FINE EDGE BLANKING AND PIERCING 5. INFORMATION ON BLANKING AND PIERCING MAGNETICALLY SOFT MATERIALS 6. INFORMATION ON SELECTION OF MATERIAL FOR BLANKING AND PIERCING DIES. 7. PROVIDED LISTING OF U.S. TRANSFORMER AND COIL PRODUCERS. 8. DISCUSSED BUSINESS STRATEGIES 9 PROVIDED A DRAWING OF EXISTING PLANT LAYOUT. 10. DISCUSSED PLANT LAYOUT IMPROVEMENTS 11. PROVIDED A HYPOTHETICAL PLANT LAYOUT FOR THE PLANT AS EQUIPPED.	1. INFORMATION ON SHORT LOT STAMPING 2. INFORMATION ON MANUFACTURERS REPRESENTATIVES IN THE U.S. 3 U.S. EXPEDITORS WHICH COULD LIST THE COMPANIES PRODUCTS	AS PREVIOUSLY OBSERVED THIS COMPANY HAS A VERY POSITIVE ATTITUDE AND IS RECEPTIVE TO ASSISTANCE. THE CLIENT AND THE CONSULTANT WORKED TOGETHER IN ARRIVING AT AN IMPROVED PLANT WORK FLOW IN WHAT INITIALLY APPEARED TO BE AN IMPOSSIBILITY. THE REARRANGEMENT IN THE PLANT WILL BE RELATIVELY MINOR BUT THE IMPROVEMENT WILL BE SUBSTANTIAL IN WORK FLOW AND DECREASED DAMAGE AND LOSS OF PRODUCT. THE CLIENT HAS IMPLEMENTED IMPROVEMENTS IN DESIGN OF TOOLING WITH THE RESULT THAT SETUP TIME IS DECREASED AND ALSO PRESS SPEED HAS BEEN INCREASED. THE ESTIMATED INCREASE IN PRODUCTION MAY BE AS HIGH AS 20%.
KOREA FERRITE SMALL FERRITE MAGNETS	3-16 CHA, JAMES UN SHIN, JUNG SUP	NO SPECIFIC NEEDS	1. COMPANY EXPRESSED INTEREST IN MOYNO TYPE PUMPS. 2. BULK MATERIAL HANDLING AND PROCESSING APPEARS TO BE THE WEAKEST AREA OF THE OPERATION.	1. DISCUSSED MOYNO PUMPS AND THEIR APPLICATION IN BULK HANDLING 2. DISCUSSED POSSIBLE CAUSES OF CRACKING AND FRACTURING OF THE PRODUCT. 3. PROVIDED INFORMATION ON HEAT TREATING BM PARTS	1. INFORMATION ON MOYNO TYPE PUMPS MANUFACTURED BY RAMAY INC. 2. INFORMATION ON MICRONIZER.	THIS COMPANY APPEARS TO BE WELL ORGANIZED AND RUN. HOWEVER THE GRINDING AND BULK HANDLING PROCESSES AND EQUIPMENT ARE WEAK LINKS. A MICRONIZER SUCH AS THAT BEING CONSIDERED BY KOREA FILLER COMPANY MIGHT BE OF INTEREST.

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TRAINING AND EXTENSION SERVICES TO THE KOREA CREDIT GUARANTEE FUND

Annual Report
(July 1, 1980 to June 30, 1981)

by

Ben E. James, Jr.

Georgia Institute of Technology
Engineering Experiment Station
Atlanta, Georgia 30332, U.S.A.

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TRAINING AND EXTENSION SERVICES TO THE KOREA CREDIT GUARANTEE FUND

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FOREWORD AND ACKNOWLEDGEMENTS

This third annual report on services provided by the Georgia Institute of Technology (GIT) in a cooperative program with the Korea Credit Guarantee Fund (KCGF) represents extensive and varied contributions from both organizations.

The Georgia Institute of Technology expresses its gratitude to the staff of the Korea Credit Guarantee Fund for their efforts and cooperation in making this year's activities meaningful and productive, and extends special appreciation to the following:

Chairman and President Doh, Bae
Chairman and President Song, Byoung-Soon
Executive Director Lee, Pan Young
Mr. Sohn, Yong Tae, Director, Extension Service Department
Mr. Cho, Young Lae, Director, Extension Service Department
Mr. Lee, Un Young, Extension Service Department
Mr. Park, Jae Sool, Extension Service Department
Mr. Kim, Kee Hoon, Extension Service Department
Mr. Shin, Jung Sup, Extension Service Department
Mr. Cha, Sang Un, Extension Service Department
Mr. Sung, Gap Sik, Extension Service Department
Mr. Kim, Kee Dong, Extension Service Department

Special acknowledgement is also given to the staff of the Mechanical Engineering Department of Soong Jun University for providing much research material and advice used on this project.

This program continues to have a dual purpose: to provide management and technical assistance to companies seleted by KCGF and to provide on-the-job training in extension methodology to KCGF extension staff as this assistance is provided. Valuable staff experience was gained on all cases.

Ben E. James, Jr.
Georgia Institute of Technology
Engineering Experiment Station

Annual Report

EXTENSION SERVICES TO THE KOREA CREDIT GUARANTEE FUND

Background

Initiated in April 1978, the Cooperative Program of Training and Technical Assistance concluded its first year. The primary objective of this program was to provide consultation, technical information services, and training to the Korea Credit Guarantee Fund as required to assist in achieving their purposes and goals. The general feeling among KCGF and Georgia Tech representatives was that it had been successful and could be profitably continued. Many of the traditional start-up problems had been resolved, and both the companies assisted and the KCGF personnel trained felt that the efforts had provided positive effects. After the second year's program had been concluded, there was again a general feeling by both KCGF and Georgia Tech that the program had been very successful in providing management and technical assistance to the KCGF-sponsored companies and training to KCGF professional staff. In the spring of 1980, Chairman President Byoung-Soon Song, Executive Director Lee, Pan Young, and Director Chung, Young Soon, visited Atlanta and signed an agreement for the third consecutive one-year program of technical assistance by Georgia Tech to the Korea Credit Guarantee Fund. This third year's program was similar to the two preceding programs conducted by Georgia Tech for KCGF.

The Georgia Tech Engineering Experiment Station provided the following services to the Korea Credit Guarantee Fund:

Training. An industrial extension training program was presented in Atlanta, Georgia, for four KCGF personnel. This resident intern program was for an eight-week period between April 1 and October 11, 1980. The participants had the opportunity to gain field experience with the industrial extension field office

system which was established in 1961 by the Georgia Institute of Technology.

The focus of this training activity was on extension services theory, principles, and methodologies. Other subject areas included analysis and evaluation of industrial projects and small and medium industry problems and needs, as well as the sources and use of technical information for industrial problem solving.

One function of this resident intern program was to provide training which would equip the participants to return to KCGF and establish short training programs for other KCGF personnel involved in extension service activity.

Provision of Management and Technical Assistance. Georgia Tech personnel worked with KCGF in Korea providing direct management and technical assistance to small and medium-size companies selected by KCGF. In addition to twenty man-weeks of field engineering, eight man-weeks of research service was provided in Atlanta. This research service was the primary back-up for the field engineers in solving specific industry problems and filling specific information requests from KCGF member companies.

The nature of these services depended to a great degree on the capabilities of the Georgia Tech personnel working with the KCGF staff, and were restricted to those companies designated by KCGF as being in need of assistance.

Appendix 1 indicates the subject matter and the schedule of the Korea Credit Guarantee Fund training program conducted in both Atlanta and in the field offices of Georgia Tech throughout Georgia. Appendix 2 indicates details of assistance provided to the individual companies selected by the Korea Credit Guarantee Fund and some of the observed or anticipated results noted during the project year.

Summary of Activities

The program of activities during this project year consisted as they had in the past years of two major segments:

Training at the Georgia Institute of Technology and in the field offices of the Engineering Experiment Station for KCGF extension staff members.

Direct management and technical assistance to Korea Credit Guarantee Fund member companies.

KCGF and Georgia Tech developed a master schedule for the entire year's activities of training and field visits by GIT engineers. In developing this schedule, time was allowed prior to each field extension engineering visit for research activities at Georgia Tech in Atlanta. This research consisted of literature searches, consultation with experts, both within and outside the Georgia Tech staff, and analytical testing in Georgia Tech laboratories. A brief field visit was scheduled for the project director to interview companies scheduled for the fourth year project activities. These interviews provided information on each company's problem areas and information needs.

1. Training. A formal training program was conducted at the Georgia Institute of Technology from August 11, 1980 to October 11, 1981. This training program was custom designed to provide experience in industrial extension techniques and principles. This training program differed from previous training programs for KCGF in that the English language training was omitted. As noted in previous reports, it was not felt that the English language training in the United States was cost effective.

   Four KCGF staff members participated in this formal training program. They were Mr. Cho, Yong Lai, Manager of the

Extension Services Department, and three of his staff members, Mr. Kim, In Woo, Mr. Kim, Sun Woo, and Mr. Kim, Kee Hoon. This training program was conducted as previously mentioned, both in Atlanta and in the field offices of Georgia Tech throughout the state. There were formal presentations of subject matter considered important to Industrial Extension personnel and case studies presented to the trainees for practice in extension application.

The informal training of Korea Credit Guarantee Fund staff was continued while the field engineers were on-site in Korea. This on-the-job training took place as KCGF staff members accompanied the Georgia Tech field engineers during their company visits. Unfortunately, one of the recommendations made by Georgia Tech in previous reports was not fully implemented. This recommendation was to increase the on-the-job training benefits to the KCGF technical staff by assigning small teams of technical staff to work with the Georgia Tech field engineers on each company. It was observed that there was almost no team approach to problem solving during this third project year. It is again recommended to the Korea Credit Guarantee Fund management that there be more involvement in problem-solving of these companies by the Korea Credit Guarantee Fund engineering staff.

2. Direct Management and Technical Assistance. This activity was carried out during four separate visits by GIT field engineers, August 10 through September 12, 1980; November 8 through December 12, 1980; March 5 through April 10, 1981; and May 24 through June 27, 1981. As in previous years, it consisted primarily of providing direct management and technical assistance to Korean companies which had been designated by the Korea Credit Guarantee Fund.

The general procedure established for management and technical assistance visits during the first-year program remained basically unchanged during this third program year. This procedure was as follows:

a. Preliminary Meeting. KCGF schedule appointments for KCGF and GIT technical personnel. This meeting was usually held at the company factory where the manufacturing operation was observed. First, company management discussed the company's background, products, processes, and other pertinent material. An inspection of the manufacturing facilities followed, with a discussion of the company's technical problems and needs. Where appropriate, suggestions for production improvements were made immediately. A final session reviewed technical areas where assistance or information could be helpful.

b. Second and Subsequent Meetings. As soon as relevant information was available or assistance ideas were formulated, KCGF scheduled one or more subsequent visits to the company. KCGF and Georgia Tech then presented the information or technical assistance concepts to the company, utilizing detailed explanations, sketches, calculations, or whatever was needed to permit management to give consideration to the recommendations.

During the previous program years, it was suggested that Extension Service Department personnel of KCGF check back periodically with the companies which had been provided information and assistance in order to determine, first, what actions had resulted from the reocmmendaitons and, second, if there were additional problems or needs. This check would allow KCGF to ascertain whether or not additional plant visits will be needed by consultants.

c. Interim Reporting. Even though the program of work called only for "Quarterly Letter Reports", two reports were submitted to KCGF after each of the quarterly field extension engineering visits. The first of these reports was a Summary Report which included the company name and product, the visit dates and names of KCGF staff involved, any previously observed problems or questions, the problems observed and questions asked during that period's visits, any action taken by the field extension engineer during that period, any recommended or planned action to be taken by either GIT or KCGF and, finally, any observed results or company reaction. This Summary Report was presented to and reviewed with KCGF management at the termination of each field extension engineering visit. Later, after returning to Georgia Tech in Atlanta, the field extension engineer submitted a Comprehensive Report. This report covered the same major subject areas as the Summary Report, but in much greater detail. It included in-depth description of problems, suggested solutions, test data, concept designs, etc.

During this phase of the program, a total of 93 management and technical assistance visits were conducted with personnel from 17 companies. In addition, many visits were made to other supporting agencies, organizations, and materials and equipment suppliers.

The nature of the technical assistance provided to these companies covered many areas. The individual company write-ups in Appendix 2 cover the types of assistance provided to each company.

A list of the specific types of assistance and information provided to the 17 companies is included here to show the scope and variety of activities. These 157 instances of assistance and information provided were both technical and managerial in nature.

Management and Technical Assistance and Information

- o Advice on ream cutter for transformer separators
- o Design concept for foot operated toggle clamp
- o Advice on conveyor installation
- o Design concept for foot-powered taping device
- o Advice on process improvement for transformer dipping
- o Coil compression force analysis
- o Conceptual design for hydraulic coil compression device
- o Supply source identification for hydraulic press components
- o Information on DC switching regulator circuits
- o Information on U.S. Underwriter's Laboratory transformer standards
- o Designed process flow charts for transformer manufacture
- o Designed comprehensive plant layout for transformer manufacturing facility
- o Provided information on electric and pneumatic staking machines
- o Provided design concept for microprocessor programmable test system
- o Information on powder coating and electrostatic spraying systems
- o Information on conventional paint spraying systems
- o Information on normal anodizing and color anodizing processes
- o Information on optical comparitors for die making
- o Comprehensive information on die making for extrusion dies
- o Analysis in GIT laboratories of aluminum extrusion defects
- o Information on U.S. aluminum extruded products
- o Information on energy conservation in furnaces
- o Information on controlling pollution from the anodizing process
- o Information on improving steam boiler efficiency
- o Information on the market for aluminum extruded products in the U.S.
- o Provided analysis from GIT laboratories on microhardness profiles of drive studs
- o Information on hardening "304" stainless steel
- o Information on drive studs and drive stud guns produced in the U.S.
- o Assistance on reducing piston failure in drive stud guns
- o Information on "cold-head" forming process
- o Information on heat treating furnaces

- o Information on exact prices of drive studs and drive stud guns from U.S. manufacturers
- o Information on tool steel heat treatment
- o Extensive research and information on measuring retained austenite
- o Information on producing black surface during tempering cycle
- o Information on vapor degreasing
- o Information on powder metal fabrication
- o Information on various processes for producing diamond tools
- o Information on stabilizing tool post grinders
- o Information on equipment and techniques for blade tensioning
- o Information on non-destructive testing of diamond cutting blades
- o Assistance in production techniques for tool post grinders
- o Information on U.S. testing laboratories for computer room floor panels
- o Information on U.S. manufacturers of computer room floor panels
- o Analysis of PVC edging failure
- o Assistance in reducing contamination in filter process
- o Information on "clean-room" design
- o Information on electronic air cleaning systems
- o Assistance in power feed systems for motorized storage racks
- o Information on paper mill waste treatment
- o Information on thin section stainless steel welding
- o Advice on lathe turning long thin-wall tubing
- o Supply sources for tungsten carbide cutting tools
- o General information on foundry practices
- o Information on U.S. trade journals
- o Assistance on producing butterfly valve gates
- o Information on CO_2 silicate casting process
- o Information on designing the "wet-end" of paper machines
- o Information on dryer-hood design for paperboard machines
- o Comprehensive information on stainless steel casting
- o Information on producing "onionskin" paper
- o Advice on modifying casting design of valve body
- o Information on die casting, plating, and anodizing aluminum
- o Assistance in developing and applying time standards

- o Advice in proper quality control gauging techniques
- o Design concepts for mechanizing production of motorcycle parts
- o Assistance in improving design of multi-drill machine
- o Concept design for spoke installation fixture
- o Information on electric discharge machining processes
- o Information on group technology concepts
- o Assistance on developing process documentation system
- o Information on designing and building die casting molds
- o Information on reducing porosity in aluminum die castings
- o Information on sub-contracting U.S. Defense Dept. spare parts
- o Information on shot-peening process for improving diaphragm springs
- o Assistance in reducing fuel tank leaks
- o Assistance in improving leak test facilities
- o Information on "Parkerizing Process" for rust prevention
- o Information on material selection for coil springs
- o Information on repair welding cast iron
- o Information on cast iron quality control
- o Information on utilization of coolant pump face seals
- o Information on materials handling
- o Information on industrial lighting systems
- o Advice on jig and fixture design
- o Information on plant layout strategies
- o Advice on using freon gas to detect casting leaks
- o Advice and assistance on cutting feeds and speeds
- o Advice on proper cutting tool geometry
- o Information on incoming quality control
- o Assistance on developing deburring methods
- o Advice on water pump functional testing
- o Information on stamping and forming die design
- o Concept design for quick release work holders
- o Concept designs for switch assembly fixtures
- o Information on hopper and magazine parts feeders
- o Assistance and advice on calculating "springback" in press forming
- o Assistance on switch spring redesign

- o Advice on punch press safety procedures
- o Comprehensive information on gear design
- o Advice on gear shaft knurling process
- o Advice and assistance in improving shaft straightening operation
- o Advice on deburring soft steel sprockets
- o Concept design for vibratory finishing system
- o Assistance in calculating proper feeds and speeds for drilling
- o Information on drill sharpening equipment
- o Conducted drilling tests at GIT to improve hole quality
- o Information on specifications for gear making machinery
- o Assistance in improving manufacturing productivity
- o Information on U.S. made vibratory finishing equipment
- o Advice on calculating gear ratios for gear testing machine
- o Advice on eliminating slitting saw burr
- o Concept designs for milling fixtures
- o Assistance in developing production control systems
- o Assistance in solving "out-of-round" problem in centerless grinding
- o Assistance in improving manufacturing process for brake cam
- o Information on reaction injection molding (RIM) process
- o Information on "RIM" equipment and molds
- o Information on sodium cyanide production process
- o Concept design for rolling sizing die
- o Design information on high speed harness taping machine
- o Design concepts for constant tension devices
- o Analysis of cable samples by U.S. cable manufacturer and GIT
- o Information on programmable harness testing design concepts
- o Advice for improvements in cable collecting and twisting equipment
- o Advice for improving jacket extrusion process
- o Concept design for steel coil handlers
- o Research from GIT on improving lamination die life
- o Information on batch annealing furnaces
- o Information on U.S. die shop equipment
- o Information on U.S. coil handling equipment
- o Assistance in plant layout improvements

- o Information on fine blanking electrical steel
- o Assistance in developing a process documentation system
- o Information on international marketing
- o Information on coil slitting
- o Assistance in developing coil slitting strippers
- o Information on "pulsewelding" processes and equipment
- o Information on U.S. welding machinery
- o Marketing information on U.S. welding machine companies
- o Information on resistance welding test procedures
- o Information on single-phase rectifier circuit design
- o Advice on hard surfacing pipe fabrication rolls
- o Advice and assistance on tailfin welding techniques
- o Information on "balanced wave" welding rectifiers
- o Information on copper alloys used for seam weld heads
- o Information on various types of $CaCO_3$
- o Assistance in maintenance procedures on Raymond Mills
- o Information on jet mills for producing high mesh $CaCO_3$
- o Economic analysis on jet milling high mesh $CaCO_3$
- o Metallurgical analysis in GIT laboratories of cracked magnets
- o Information on lubricants for powder compacts
- o Information on fine particle ferrites
- o X-ray spectrographic analysis by GIT laboratories of ferrites
- o Information on specifications for Ramoy pumps
- o Information on heat treatment of powder metal parts

From the number and variety of topics on this listing, it is obvious that a great deal of time and effort was spent providing information and assistance to the selected companies. Even in the rare cases where the company was not receptive to the assistance offered, the KCGF staff gained valuable experience. Based on the assistance and information provided to the companies and the experience gained by the KCGF staff, the program has obviously met its original objectives and has provided a positive impact on Korean Industry.

Appendix 1

TRAINING FOR KCGF STAFF

TRAINING PROGRAM, KCFG STAFF

Date	Instruction Topic or Activity	Staff
August 11, 1980	Welcome to IPD Orientation	R. Yobs B. James
August 12	Introduction to Field Office Activities	B. James
August 13	Records & Reporting	R. Hawkins
August 14	Supporting Services	E. Berg
August 15	Introduction to Case Study Approach	B. James
August 18	Marketing Analysis Assistance	D. Lanier
August 19	Small Business Administration	H. Taylor
August 20	Inventory Control	E. Lewis
August 21	Economic Development Extension Activities	E. Berg
August 22	Equipment Replacement & Analysis	P. Loveless
August 25	Field Office Visit: Rome	W. Darley
August 26	Quality Control	W. Darley
August 27	Case Studies	W. Darley
August 28	Field Office Visit: Gainesville	P. Loveless
August 29	Gainesville (Return to Atlanta)	P. Loveless
September 1	LABOR DAY HOLIDAY	
September 2	Information Data Bank	R. Johnston
September 3	Export Opportunities	Korean Consulate C&S Bank
September 4	Industrial Park Visits, Atlanta & Carrollton	E. Berg

TRAINING PROGRAM, KCFG STAFF

(Continued)

Date	Instruction Topic or Activity	Staff
September 5	Small Business Administration	H. Taylor
September 8	Field Office Visit: Macon	G. Lee
September 9	Field Office Visit: Macon	G. Lee
September 10	Field Office Visit: Albany	E. Lewis
September 11	Field Office Visit: Albany	E. Lewis
September 12	Return to Atlanta	
September 15	Field Office Visit: Augusta	R. Junk
September 16	Plant Layout	R. Junk
September 17	Field Office Visit: Savannah	L. Edens
September 18	Savannah	L. Edens
September 19	Savannah	L. Edens
September 20-21	Weekend in Savannah	
September 22	Field Office Visit: Douglas	S. Dudley
September 23	Cost Control	S. Dudley
September 24	Plant Visits	S. Dudley
September 25	Travel to Carrollton	
September 26	Appropriate Technology Applications	B. James
September 29	Production Planning	L. Tessner
September 30	Work Sampling	L. Tessner
October 1	Case Histories: Industrial Extension Problem-Solving	B. James
October 2	Plant Visits: Atlanta	E. Berg

TRAINING PROGRAM, KCFG STAFF

(Continued)

Date	Instruction Topic or Activity	Staff
October 3	Case Histories: Industrial Extension Problem-Solving	B. James
October 6	Report Writing	
October 7	Report Writing	
October 8	Report Critique	B. James
October 9	Wrap-Up	
October 10	OPEN	
October 11	Depart for Korea	

Appendix 2

INDIVIDUAL COMPANY REPORTS

COMPANY A

Number of Visits

Eight by GIT and KCGF personnel

Principal Products

Small transformers for audio equipment

Observed Problems

This company required information on Underwriter's Laboratories standards from the United States. They also required general information on 1.5 kV 45-60 watt transformers. In addition to these specific problems, the company required assistance in several problem areas involved in the process of manufacturing transformers. These included methods of compressing the coils, winding, hand-taping, and attaching the transformer clamps. This company also had a problem in the testing area. They desired an automatic sequenced testing device. Most outstanding of the company's problems, however, was their desire and need for assistance in improving their overall plant layout and materials flow.

Action Taken to Solve Problems

This company was provided with information reprinted from the United States Underwriter's Laboratories' standards. Several designs were also made for this company for coil clamping devices. The final concept design was made after extensive testing on the compressive forces necessary for clamping at one of the laboratories at Soon Jung University. Staff specialists at GIT in Atlanta provided several design concepts for electrical circuits to be used in the automatic sequence testing equipment. An in-depth and comprehensive plant layout design was produced for this company.

Observed Results from GIT Assistance

Even though the results from the information and assistance provided this company are indeterminant at this time, the enthusiastic response of the company indicates that many of the suggestions and concepts provided to this company will be put into use in the near future.

COMPANY B

Number of Visits

Six by GIT and KCGF personnel

Principal Products

Aluminum extrusions and door frames fabricated from aluminum

Observed Problems

This company requested information involving general process data on the extrusion of aluminum. They also requested general information on color anodizing and modern techniques of billet-making. A major concern of this company was in energy conservation. Another problem that this company was experiencing was in determining the cause of surface defects on the aluminum extrusions. They also required assistance in improving the hardening process of their extrusion dies as well as general information on advanced die-making techniques.

Action Taken to Solve Problems

This company was provided with extensive information on die-making techniques, how to design dies, and how to correct problems caused by dies. This company was also provided with information on powder coating and electrostatic spraying equipment and processes. Extensive information was provided this company on regular anodizing and color anodizing process parameters. Samples of this company's extrusions were brought to the United States and analyzed in the laboratories of GIT in order to determine the cause of the surface imperfections. Assistance and advice was also provided to this company on how to reduce their energy requirements. In addition to the other information, extensive information on aluminum extrusion markets in the United States was provided.

Observed Results from GIT Assistance

From the laboratory analysis done at GIT in the United States on surface imperfections in the aluminum extrusions, this company was able to make certain process changes which reduces these problems. Based on information and advice given to this company, they should be able to improve their energy conservation techniques. Also, marketing information provided to this company should assist them in improving their ability to export to the United States and other Western countries.

COMPANY C

Number of Visits

Five by GIT and KCGF personnel

Principal Products

Custom or job shop heat treating ferrous parts for other companies

Observed Problems

This company required information on how to properly heat treat and what material to use for producing drive studs. They also required information on how to harden number "304" stainless steel. They requested information on how to eliminate soft spots in rimmed steel. This company also wanted information on how to obtain uniform hardness in the heat treating process of an AISI 4140 alloy steel. This company requested specific information on decarborization methods using a "drip feed" furnace. A subsidiary of this company required information on how to prevent premature failure of a drive piston in and a stud gun. This subsidiary company also requested information on using the "cold head" process for manufacturing drive studs. The main company required information on guidelines for controlling retained austenite in tool steels. In addition to this, they also requested information on various processes for cleaning the steel after heat treating. Other information requested included how to obtain a black finish on structural steel bolts after the tempering operation.

Action Taken to Solve Problems

Information was researched in the United States and provided to this company on how to harden "304" stainless steel. Information was also provided on homogenizing techniques for obtaining uniform hard-

ness in AISI 4140 steel. Extensive laboratory analysis was done in the United States in the laboratories of GIT in order to obtain the hardness profiles on the drive studs. Detailed design information on United States-made drive stud guns and drive studs was provided to this company. In addition, the field engineer made many suggestions and provided concept designs on how to reduce the piston failure in the stud gun. Information was provided to this company on various processes for cold head forming the drive studs. Information was also provided to this company on various types of heat treating furnaces. Quotations were obtained from United States manufacturers of both drive studs and drive stud guns and provided to the subsidiary company. Research was done in the United States and provided to this company on various methods of measuring the retained austenite in tool steels. In addition, information was provided to this company on how to obtain black surface during the tempering cycle. And finally, extensive information was provided to this company on how to use various types of solvents in order to clean the heat treated parts.

Observed Results from GIT Assistance

From much of the information provided this company, there were no immediate discernible results. However, from much of the research done in the United States, particularly on hardness profiles of the drive studs, this company will be able to improve their manufacturing procedure and come out with a much higher quality product. When the company is able to implement many of the suggestions and use much of the information that was provided by GIT, there should be definite observable improvements in their operation.

COMPANY D

Number of Visits

Three by GIT and KCGF personnel

Principal Products

Diamond cutting tools, diamond wheels, diamond cutting saws, and diamond polishing compounds

Observed Problems

This company requested information on techniques for metal powder sintering. Specifically, they requested information on the size effect that metal powder would have on the component parts. In addition to this, they also needed information on the effect that particle shape would have on the final product. This company requested information on techniques and methods in the United States on mixing techniques and the production of diamond products and general information on the production of diamond tools. This company indicated a need for information on drilling and cutting carbide by the use of lasers.

Action Taken to Solve Problems

This company was provided with information on the variables of powder metal fabrication and the techniques of producing diamond tools. This company was also provided with extensive information on how to hand-tension diamond cutting blades. They also were provided with information on non-destructive methods of testing cutting blades.

Observed Results from GIT Assistance

Between the visit by the first consultant and the visit by the last consultant in this last period, the company moved into a new produc-

tion facility. Much of the information provided to this company by GIT will be able to be used in the future as the company expands its present production.

COMPANY E

Number of Visits

Five by GIT and KCGF personnel

Principal Products

Ferrite magnets

Observed Problems

This company required general information on techniques for improving their overall manufacturing productivity. As part of this general information, they requested assistance and ideas in improving a press feeding system for prepared ferrite powder prior to molding. The most important problem being experienced by this company was concern with the horizontal cracking in disc magnets. They requested the assistance of GIT in helping to analyze the cause for the failure of these magnets.

Action Taken to Solve Problems

Samples of the cracked magnets as well as samples of good magnets were taken to GIT in Atlanta and extensive tests were run on these samples in GIT laboratories. This testing consisted of using the electron microscope in GIT laboratories to determine if there was a difference in density between the cracked magnets and the uncracked magnets. Information was also supplied to this company regarding various types of lubricants which can be used to make powder compacts. General information was provided to this company concerning fine particle ferrites. In conjunction with the cracking problem, samples of ferrite from Japan were compared with samples of ferrite made in Korea in the GIT laboratories in Atlanta. This analysis consisted of X-ray

spectographic analysis. Nine major elements were identified in each of the samples. Comparative X-ray spectograms were provided the company. General information on productivity improvement included information on the use of jet mills as opposed to their conventional ball grinding mill. General information on heat treating powder metallurgy parts was provided to this company.

Observed Results from GIT Assistance

Even though the company enthusiastically received all of the information provided by GIT, there were no obvious or immediate observable results.

COMPANY F

Number of Visits

Four by GIT and KCGF personnel

Principal Products

Steel elevated floor systems for computer rooms and ultra-fine stainless steel wire mesh

Observed Problems

The company requested information on sources in the United States for testing computer room floor panels. This company also requested information and data on competitive types of computer room floor systems produced in the United States. This company requested information on electrical power feed systems for their tape storage cabinets. Another problem which the company outlined was that of excessive dirt and dust on the ultra-fine stainless steel wire mesh filters which they produced.

Action Taken to Solve Problems

This company was supplied with data on testing laboratories in the United States which could test their computer room floor panels. They were also provided data on United States-made competitive computer room floor systems. Technical assistance was provided this company on the problem that they were having with PVC edging. Extensive information was provided this company on systems for obtaining dirt- and dust-free air in the room which produced the ultra-fine stainless steel mesh. Concept designs were provided to this company on power feed systems for their tape storage cabinets.

Observed Results from GIT Assistance

There were no immediate observable results from the information and assistance which GIT provided this company.

COMPANY G

Number of Visits

Five by GIT and KCGF personnel

Principal Products

Major equipment for pulp and paper making including copper and stainless steel alloy castings

Observed Problems

This company requested information on paper mill waste treatment methods and equipment. Another request involved a problem with the welding of thin stainless steel plates and tubing. Other problems included techniques of lathed turning, long thin wall tubing, and general information on cutting tool selection for various materials. This company had a request for general information on good foundry techniques. Other information requested by this company included extensive technical lists of information on the design of various paper-making equipment. They also wanted to know how to control carbon content on remelting stainless steel.

Action Taken to Solve Problems

The company was provided with extensive and specific information on treating paper mill wastes. Information was also supplied on the welding of stainless steel. Concept designs were given to this company on methods for turning long thin-walled tubing. Information on general foundry techniques and procedures were supplied to this company as well as a listing of trade journals for foundries. General information on welding processes and foundry techniques were provided to this company. Extensive and specific information on the design of paper-making equipment was provided to this company.

Observed Results from GIT Assistance

Even though there were no immediate observable results from the information and assistance given to this company, their management and technical staff indicated enthusiastic interest. It is anticipated that much of the advice and assistance can be implemented within a relatively short period.

COMPANY H

Number of Visits

Seven by GIT and KCGF personnel

Principal Products

Aluminum die casting for motorcycles and automobiles

Observed Problems

This company requested information on die casting rejection rates in the United States. They also requested assistance in writing general manufacturing process instructions and information on process parameters for aluminum die casting processes. They also requested information on normal and color anodizing as well as chrome-plating processes. This company needed assistance and information on the design and the production of jigs and fixtures and in improving generally their manufacturing methods for productivity improvement. This company also requested specific assistance on reducing the amount of time and labor for installing spokes on motorcycle wheels. The company also wanted to know of any type of special surface treatment or heat treatment for die cast parts which could produce small internal combustion engines.

Action Taken to Solve Problems

This company was supplied with extensive data on die casting aluminum as well as processes for plating aluminum and regular and color anodizing aluminum. Direct technical assistance was given to this company in the area of developing manufacturing processed standards as well as time standards. General suggestions were given to this company in various parts of their manufacturing operation for improving

their productivity by reducing the amount of labor necessary to produce the parts. Concept designs were provided to this company for fixtures to install spokes in the motorcycle wheels. General information was provided to this company on how to produce and maintain die casting molds. Specific information was given to this company on methods to correct porosity problems in aluminum die castings.

Observed Results from GIT Assistance

All of the information and assistance provided to this company was enthusiastically received by the company technical management. It is felt that in a very short time many of these suggestions will be put into practice and their productivity will improve dramatically.

COMPANY I

Number of Visits

Three by GIT and KCGF personnel

Principal Products

Various automotive components such as clutch discs, clutch pressure plates, lock assemblies, and pick-up truck bodies

Observed Problems

This company's primary request for information was for characteristics and testing methods for brake discs which would be used on the American C54 and F5 aircraft brake discs. They also requested general information on the overall manufacturing processes for these brake discs. In addition, the company requested data on how to increase the flexure life of their diaphragm springs. Another request for information concerned a problem that this company was having in detecting leaks in fuel tanks they were producing.

Action Taken to Solve Problems

This company was provided with direct technical assistance in the form of advice on how to increase the life of the diaphragm springs by shot-peening. In addition, direct technical assistance was provided to assist this company in solving their gas tank leak problem. General information on how to get drawings on the F5 and C54 aircraft brake discs were given to the company. Since most of this information in classified by the Department of Defense, this company must become a qualified bidder for U.S. Defense Department work. These guidelines which we provided to the company will assist them in becoming a qualified bidder.

Observed Results from GIT Assistance

There were no immediate observable results from the assistance and advice provided to this company by GIT.

COMPANY J

Number of Visits

Three by GIT and KCGF personnel

Principal Products

Automotive water pumps and automotive oil pumps

Observed Problems

One of the most critical problems that this company indicated was the quality level of their gray iron castings purchased from outside foundries. They requested assistance in determining the best method for incoming inspection of these castings. In addition to this, they also requested information and assistance on developing a process for repairing these castings when a defect was found. The company required information involving conceptual design for an induction coil heating system used to expand the casting prior to the insertion of a bearing. This company also needed information in determining the proper fit between the impeller and the water pump shaft and the water pump hub. Other general requests for assistance were made in the area of factory layout, general manufacturing methods, and materials handling. This company requested assistance in leak testing the automotive water pumps. This company needed information on the design and fabrication of manufacturing tools, jigs, and fixtures.

Action Taken to Solve Problems

This company was provided with information on welding and brazing cast iron. In addition to this, they were also provided with information on quality control for gray cast iron castings. Information on cooler pump face seals was provided to this company. General infor-

mation and assistance was also provided to this company on some principals and concepts of material handling, lighting systems, jig and fixture design, and clamp layout strategies. Assistance was also provided on alternative methods for determining leaks in the gray iron castings. This company was provided with extensive information on machining cast iron. This information included how to determine the cutting speeds and feeds as well as proper coolants to use. Concept designs were provided this company for leak testing the automotive components they were manufacturing.

Observed Results from GIT Assistance

All the assistance and information provided to this company was well received by company management and company engineers. The company gave every indication that they were going to implement many of the suggestions and ideas provided for them in the immediate future.

COMPANY K

Number of Visits

Four by GIT and KCGF personnel

Principal Products

Appliance thermostats and controls

Observed Problems

This company requested information on how to calculate and allow for tolerance buildup during the design of dies which contain several segments. In addition to this specific request, they were needed information on general die design practices. The company also wanted information on case studies of type of instruction for die design and general information on electric discharge machining. The company required information on work place safety, and finally, the company needed information on how to hold tolerances on stamped and bent copper and alloy parts.

Action Taken to Solve Problems

This company was supplied with a comprehensive handbook on die design that, if properly used, would give them the answer to many of their die design problems. Also provided to this company was extensive data to electric charged machining equipment as well as information on the methods and techniques of electric discharge machining. Technical assistance was provided to this company on proper fixture designing concepts. In addition to this, information was provided to this company on magazine feeding small parts. Considerable information was provided this company on how to meet tolerances when bending small copper alloy parts. The company was supplied with

charts and data which related springback to various tempers of copper alloy material. Finally, extensive information was provided to this company on work place safety.

Observed Results from GIT Assistance

Even though the information and assistance provided this company by GIT engineers was well received and understood by the company engineers and the management, there were no immediate observable results from the assistance and information provided them.

COMPANY L

Number of Visits

Ten by GIT and KCGF personnel

Principal Products

Various types of gears and shafts for industrial and automotive uses

Observed Problems

The company required information on techniques, materials, and equipment for the inspection of castings and forgings purchased from the outside. In addition to this, the company needed information on how to metallurgically homogenize gears and gear blanks. The company also required assistance and information on how to knurl heat treated shafts. The company required general data on gear design. The company also required assistance in determining an approved method for straightening warped heat treated shafts and how to deburr soft steel motorcycle sprockets. The company also needed assistance in how to improve the whole quality and drill life in holes that they were drilling in mild steel. The company required information in how to determine by simple analytical procedures the correct gearing components to arrive at specific gear ratios for a Gleason gear testing machine. The company needed assistance and information on how to properly produce by centerless grinding hardened steel shafts.

Action Taken to Solve Problems

The company was provided with extensive information on gear design and manufacture. The company was also provided with direct technical assistance in analyzing the shaft straightening methods. Concept

designs and experimental techniques were established to determine an approved method for deburring the soft steel sprockets. Extensive information and assistance was provided to the plant manager on how to determine the proper speeds and feeds for drilling soft steel. Many concept designs for special gear making tooling and fixturing was provided to this company. Direct technical assistance was provided to the plant manager on solving the problem of improperly centerless grinding the shafts.

Observed Results from GIT Assistance

The company management was extremely enthusiastic about the information and assistance received by GIT consultants. Many of these recommendations have already been implemented. It is very probable that in the near future many more of the suggestions and information that GIT has provided to this company will be put to use.

COMPANY M

Number of Visits

Three by GIT and KCGF personnel

Principal Products

Polyurethane resins

Observed Problems

This company indicated that they needed information on reaction injection molding systems. They also needed data on the commercial process for manufacturing sodium cyanide from hydrogen cyanide. This company desired information so that they might affect a joint venture with some United States company to produce reaction injection molding materials. They were also interested in information on any U.S. company which might be interested in licensing this company the technology to produce reaction injection molding chemicals.

Action Taken to Solve Problems

Extensive information was provided this company on the reaction injection molding systems, reaction injection molding materials, and reaction injection molding equipment. General information was also provided this company on the commercial process for manufacturing sodium cyanide from hydrogen cyanide.

Observed Results from GIT Assistance

There was no observed results from any of the assistance or information that GIT provided this company. Because of the negative attitude due to the management of this company, it is doubtful that any of this information will ever be put to use.

COMPANY N

Number of Visits

Four by GIT and KCGF personnel

Principal Products

Electrical wire and cable and wire automotive harness

Observed Problems

This company required information and assistance on how to eliminate a non-concentric relationship between the outer jacket of the cable and the internal conductive portion. The company also requested general information on various types of insulating compounds for electrical wire and cable. This company also needed assistance in procuring or developing a mechanized taping equipment for the wire automotive harness assembly. The company also needed assistance and information for various concepts which would help them to maintain a constant tension on the cable being fed into the extrusion machine. This company also requested assistance in solving a problem concerning the outer jacket of the cable not being round.

Action Taken to Solve Problems

A concept design for a low-friction rolling die was designed to be used prior to the jacket extrusion process. Information and design drawings on American-made mechanized tipping machines were provided to this company. Concept designs were provided to this company which could be of help in designing a constant tension device for the infeed during an extrusion process. Samples of this company's wire were taken to the United States for analysis by an American cable manufacturing company. The American Cable Manufacturing Company's comments

were then relayed to this Korean company. Information on programmable controllers for testing the automotive wire assemblies was provided to this company as well as information and assistance on improving the collecting and twisting machines.

Observed Results from GIT Assistance

The company enthusiastically received the information and assistance provided by GIT consultants, however, there were no immediate results observable.

COMPANY O

Number of Visits

Nine by GIT and KCGF personnel

Principal Products

"E-I" cores for transformers

Observed Problems

This company's primary concern was with the short die life on their dies for punching the E-I cores. They also requested information on batch annealing furnaces using nitrogen atmosphere. The company requested assistance on methods for monitoring the thickness of core steel as it went through the slitting process. This company also needed information on how to maintain a blue coating on the laminations during the annealing process. The company also needed information on how to determine and correct excessive "cross strip camber". The company needed several items of assistance or information such as how to make improvements on the stripper methods, information on various die design techniques, and how to compare the output and strokes per minute between Japanese and United States lamination presses and compare that to the Korean lamination presses. The company required the general information on "chute" design as well as general information on improved die shop facilities process and equipment. The company required assistance in developing an improved factory layout for their facilities.

Action Taken to Solve Problems

Research was done in the United States by contacting the tool and die shop of a large general electric company facility. A manager of

this die shop was able to provide the information on how to increase the die life of laminating presses. Other information was provided to this company on various types of batch annealing furnaces. Extensive general information on die shop equipment was given to this company. In addition to this, information was provided to this company on coil handling equipment. Extensive direct technical assistance was provided this company on improving their factory layout. This assistance include the analysis of the existing layout and designing several alternative layouts for this management's consideration. Information was provided to this company on special processes such as fine edge blanking and annealing. Specific information on international world marketing was provided to this company as well as information on special information on coil slitting.

Observed Results from GIT Assistance

The information and assistance provided to this company was enthusiastically received and many of the suggestions and much of the information was being put into practice by the time the GIT consultants left. It is very likely that most of the information and assistance provided to this company will be put to use in improving the company's manufacturing processes.

COMPANY P

Number of Visits

Six by GIT and KCGF personnel

Principal Products

Electrical welding equipment including arc and resistance welding processes

Observed Problems

This company had requested general information on the pulse welding processes and equipment. This company also requested design information on single phase welding rectifiers. The company also requested information on the types of copper alloys best suited for reducing wear and high resistance in seam will components. The company needed information and assistance on determining the best process for hard surfacing forming rolls used in the manufacture of pipes. Also requested from this company was the direct assistance in determining the best methods for fabricating aircraft missile tailfin assemblies. General information was required on power sources used for "TIG" welding processes.

Action Taken to Solve Problems

Based on research done in the United States, extensive information was provided this company on pulse welding processes and equipment. Also provided to this company was various catalogues on welding equipment made in the United States. This company was provided with extensive information on welding data symbols and testing procedures published by the Resistance Welding Manufacturers Association. Research was done in the United States and provided to this company on

single phase rectifier circuit design. Also, much information was provided to this company on hard surfacing pipe fabricating rolls. Direct technical assistance was provided this company on some of the recommended techniques and methods for welding tailfin assembles. Information was also provided to this company on power sources for TIG welding. A complete description of the copper alloy materials commonly used for well heads and electric seam welding machines was located and given to this company. Advice was given to the company engineers on the design of their latest seam welder.

Observed Results from GIT Assistance

This company was very enthusiastic in their reception for the assistance and advice and information given by the GIT consultants. In almost all cases, the advice and assistance was given to a large team of the company's management and engineering staff. It is very likely that much of this information and assistance will be put to very good use in the future in order to improve their manufacturing and management problems.

COMPANY Q

Number of Visits

Four by GIT and KCGF personnel

Principal Products

Fine mesh calcium carbonate and talc

Observed Problems

This company requested information on equipment which can produce 600 mesh $CaCO_3$ at the rate of 1½ metric tons per hour. This company also requested any information that they could get on coating the $CaCO_3$ particles to produce a round particle shape. The company also wanted information on how to produce a white $CaCO_3$ from off-white raw material. This company was also interested in securing information on the process for producing a low density $CaCO_3$.

Action Taken to Solve Problems

This company was supplied with general information on $CaCO_3$. They were also supplied with the information that low density $CaCO_3$ is a trade secret by United States company and was not available. Information was provided this company on the maintenance procedures for some of their grinding equipment. Quotations were obtained from 2 United States companies on a process for jet milling the raw material in order to produce the 600 mesh $CaCO_3$ at the rate of 1½ tons per hour. During a subsequent visit by a GIT consultant, this original information from jet mill manufacturers was reviewed with the company and a feasibility study was performed.

Observed Results from GIT Assistance

This company eagerly received all of the information and assistance provided by the GIT consultants. Based upon the feasibility study and the information provided the company, they will probably make a decision in the near future on whether or not to purchase this type of equipment.

Appendix 3

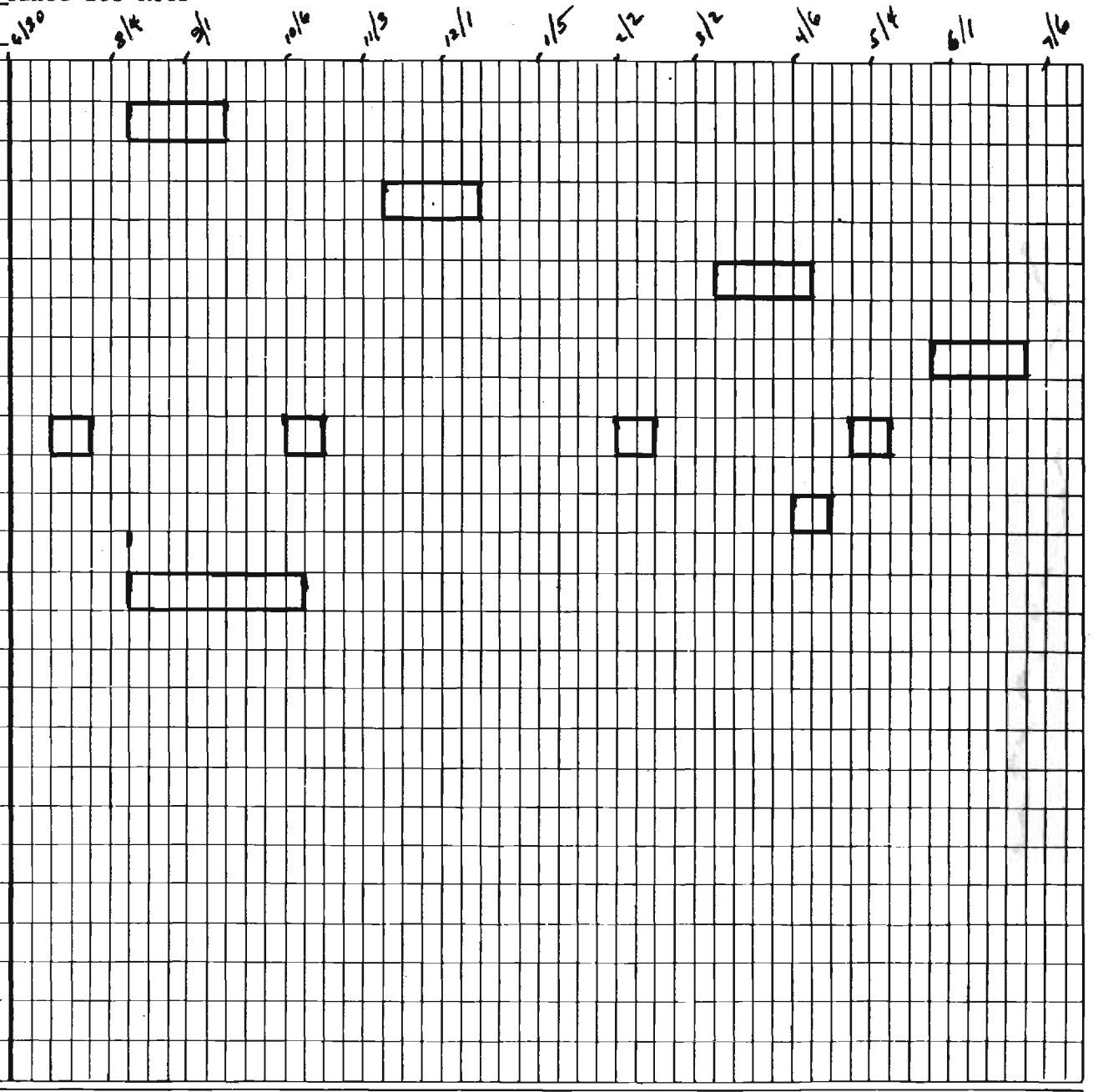
Project Plan

Project No. A-2652

PROJECT PLAN

Project Title Training and Technical Assistance for KCGF

Project Director Ben E. James, Jr.



LEGEND